Designing a curriculum on Internet health resources for deaf high school students*

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Purpose: This paper examines the integration of instruction about quality health resources on the Internet into the health curriculum of a specialized high school for students with hearing disabilities.

Setting/Participants/Resources: The Health Sciences Library System (HSLS) at the University of Pittsburgh has formed a partnership with the Western Pennsylvania School for the Deaf (WPSD).

Brief Description: This project was partially funded through a subcontract with the National Library of Medicine. As one component of its Health Information for the Public project, HSLS formed a partnership with the WPSD. This partnership allowed for a librarian to provide instruction to health education and learning center teachers and students at WPSD about health resources on the Internet. This paper describes the planning process, curriculum development, and challenges encountered. These challenges include student knowledge of English as a second language, the need for a sign language interpreter, students' third-to-fourth-grade reading levels, and the need for appropriate visual presentations to accompany the audio counterpart.

Results/Outcome: The partnership formed between HSLS and WPSD improved deaf high school students' ability to locate quality health information on the Internet.

Evaluation Method: A pre-class survey and post-class survey were used to determine the impact of the instruction.

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INTRODUCTION

According to the literature, ''hearing impaired students are often at a disadvantage in finding reliable sources of information that deal with personal and practical living skills'' [1]. To address this need, the Health Sciences Library System (HSLS) at the University of Pittsburgh created a partnership with the Western Pennsylvania School for the Deaf (WPSD), through a project that was partially funded by the National Library of Medicine under a contract with the New York Academy of Medicine. The goal of this project was to teach deaf high school students Internet-searching skills, allowing them to locate reliable and authoritative health information. This audience was chosen, because the deaf population often has difficulty communicating verbally with people such as librarians, health care providers, and social agencies. By searching the Internet, they could obtain information without having to correspond through a telephone relay service, written notes, or interpreters. A review of the literature located no pertinent articles that addressed deaf students learning about Internet health resources from librarian instructors.

BACKGROUND

The HSLS consists of four libraries: Falk Library of the Health Sciences, Western Psychiatric Institute Clinic Library, James Frazer Hillman Health Sciences Library, and Hopwood Library: A Health Resource for Patients and Families at UPMC Shadyside. Together, they serve the six schools of the health sciences at the University of Pittsburgh, as well as the hospitals and facilities of the UPMC Health System.

The Western Pennsylvania School for the Deaf (WPSD), opened in September 1869, serves children with hearing disabilities from across the state of Pennsylvania. Some of the students must travel substantial distances to attend WPSD, which is located in Pittsburgh. Due to these distances, WPSD supports a residential and a day program for the students. Students who live more than fifty miles away are commonly in the residential program. Students who live within fifty miles of the school are in the day program and are transported to WPSD by their home school districts. The students who attend range in age from two to twenty-one. Two hundred and twenty three students were in attendance during the 2000/01 school year. The average class size ranges from six to eight students.

WPSD uses a wide variety of child-centered communication methods [2], which may include:

- American Sign Language (ASL), which is a visual-gestural language complete with its own rules for syntax and grammar [3]
- Oral Approach, which supports using the residual hearing of a person through the development of spoken language [4]
- Speechreading, which is accomplished by watching the speaker's mouth, tongue movement, and facial expressions [5]
- Cued Speech, which uses hand-based gestures to help distinguish various phonemes of speech that look similar on the lips [6]
- Signing Exact English (SEE), which is a way to represent the English language on the hands [7]
- Total Communication, which uses all possible modes of communication (ASL, English, facial expressions, gestures, mime, etc.) to facilitate language development [8]

METHODOLOGY

Preface

A curriculum on Internet health resources for deaf high school students was designed using a team approach. The team consisted of a reference librarian from HSLS, the learning center director, learning center teacher, and three health education teachers from WPSD. The learning center is an interactive library that houses print and electronic resources as well as a theater area for storytelling [9]. The curriculum team designed pre-class and post-class surveys and developed two classes as part of the health education component for tenth grade students. This curriculum was then integrated into the students' health education class. At WPSD, the age range is in three-year increments for a single grade. Thus, the average age for a tenth grade student is sixteen, but students may range in age from fifteen to seventeen.

Challenges

Several challenges were encountered in developing and teaching the class curriculum, including:

- Need for cultural sensitivity: Many in the Deaf culture (using the upper case ''D'') see their deafness not as a medical disability but rather as the defining characteristic of a subculture living in the United States. Because this group shares a cultural outlook as well as a medical condition, instructors must be sensitive to this orientation [10].
- Differences between ASL and English Language: ASL is the third-most common language in the United States and approximately 100,000 to 500,000 people use this language to communicate [11]. ASL can be defined as a visual-gestural language that is used as a primary means of communication. ASL has a different syntax, grammar, and idiom vocabulary than the English language [12]. An example is the English sentence ''My name is Mary.'' In ASL, the sentence would read, ''name mine Mary.'' This short sentence dem-

onstrates differences in grammar between the two languages.

■ Disconnected patterns of interpersonal communication: Broken eye contact often occurs between the hearing and the Deaf, when interpreters are used. Deaf people must look at interpreters to understand what hearing people say to them. During this process, facial expressions and eye contact are often lost between hearing instructors and deaf students [13]. Similarly, when the deaf students worked independently on the computer, the librarian instructor often had difficulty getting their attention. Techniques that visually helped to gain the students' attention included tapping the students on the shoulder or stomping on the floor. These techniques may seem rude to hearing people but are acceptable ways of gaining deaf people's attention [14].

■ Difficulty with medical terminology: The deaf population often has more difficulty understanding ambiguous medical terminology. Interpreting medical test results may be especially difficult. The word ''positive'' is usually related to ''good,'' but a positive result on a medical test may not be good news. For instance, a deaf person has a biopsy performed, and the results indicate ''positive for cancer.'' When receiving the ''positive'' biopsy result, the deaf person may believe this is good when actually it is unfavorable. It is often complicated for health care professionals to explain to deaf people that positive means they have a disease, while negative means they do not [15].

The librarian instructor overcame these challenges by acquiring knowledge of how to teach deaf high school students. The instructor gained this knowledge by previous college coursework in sign language, watching WPSD instructors teach classes, and asking detailed questions of the WPSD instructors about effective techniques in teaching this special population.

Pre-class survey

The pre-class survey consisted of eight questions and was distributed to the students before class one. The survey was used as a guide to help the librarian instructor determine the student's level of Internet skills. The original survey had to be rewritten for a lower readability level, because students in deaf high schools typically read on a fourth-grade level [16]. Once rewritten for readability, the pre-class survey used yes/no questions instead of a Likert scale. This change was made at the suggestion of the WPSD learning center teacher. The teacher felt the students would be able to answer yes/no questions more effectively than rating their answers on a scale.

Class one

The librarian instructor taught class one in lecture format to twenty-two students in the reading room at WPSD. The class session was ninety minutes in length. To begin the class, a consumer health information Web page† created by HSLS librarians was shown to the students. This Web page provided a direct access point on the Internet for the students to begin searching for health information. After a review of the Web page, three main class topics were introduced to the students:

1. using search engines to locate health information
2. evaluating Websites
3. navigating through the MEDLINE*plus* Website

A tool that helped in teaching this population was a SMARTboard. The SMARTboard is an interactive whiteboard connected to a computer and a projector. This technology allowed for more eye contact between the instructor and the students. Instruction could still be given in sign language, while the instructor navigated the Internet on the SMARTboard screen with one hand.

Class two

Held two days after class one, this class was conducted in a hands-on format at the school's computer lab. Due to a class scheduling conflict, only ten of the original twenty-two students were able to participate in class two. At the beginning of class, material from class one was reviewed. The students were then given an independent learning activity (Appendix A) with two descriptive medical scenarios and three questions to complete. This activity was created to help the students navigate through the MEDLINE*plus* Website, one of the Websites introduced to the students during class one. All of the students answered questions one and two with 100% accuracy. The students responded with 80% accuracy to question three. The activity also included a scenario, where the students had to answer three questions about using a search engine. They answered all three questions appropriately.

During the second part of class two, the students had to use their new skills to evaluate preselected Websites for reliable information. To view the preselected Websites, mounted printouts of the Websites were attached to a poster board, so the students could compare two or more Websites at once. This activity resulted in a lively nonverbal discussion about the Websites they were viewing. This discussion occurred as the students signed among themselves. The interpreter chose a student and voiced to the librarian instructor what the student said. Then, the interpreter signed the librarian's answer back to the student. Meanwhile, the students kept signing to each other. Questions raised in the discussion included:

■ ''Is the information current?''
■ ''Does it need to be current?''
■ ''What is the purpose of the Website?''

† Health Information for the Consumer, created by Health Sciences Library System librarians, may be viewed at http://www.hsls.pitt.edu/chi/.

- ''How is reliable is the information?''
- ''Are sources cited?''

Students identified answers to these questions using the handout introduced in class one titled ''Evaluating Internet Resources: Factors to Consider'' by Gale Dutcher of the National Library of Medicine [17]. After class two, the WPSD teachers commented favorably on the students' high level of interest and involvement.

Post-class survey

The post-class survey was identical to the pre-class survey. The post-class survey was disseminated only to students who completed both classes. This measurement tool was used to assist the curriculum team in determining the student's newly acquired Internet search skills after three hours of Internet resource instruction.

CLASS RESULTS

Twenty-two students completed the pre-class survey (Appendix B) and ten students completed the post-class survey (Appendix C). Both of the surveys were completed anonymously. Due to a scheduling conflict, twelve students did not complete the post-class survey, because they were not able to participate in class two. The school calendar did not allow for make-up classes. The pre- and post-class survey results showed that over 80% of the students used the Internet to access health information before and after the class. Another finding was that after viewing the Websites demonstrated in class, the students found health information easier to comprehend. The post-class survey results showed a significant increase in the use of the MEDLINE*plus* Website. However, as a result of the scheduling conflict and the anonymously answered surveys, a direct comparison of the results was not possible.

CONCLUSION

The integration of health sciences information instruction into the curriculum of a high school for the Deaf was an innovative approach to teaching this population. Through this teaching approach, the librarian instructor was able to help deaf high school students to access reliable and authoritative health information on the Internet. Positive feedback demonstrated that completing the independent learning activities and lively discussion on Website evaluation helped deaf students gain valuable knowledge from these classes.

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APPENDIX A

Western Pennsylvania School for the Deaf: independent learning activity during the 2000/01 school year

Problem: Your younger brother accidentally drinks blue window cleaner instead of the blue Kool-Aid in the refrigerator. You don't know if you should make him throw up (vomit) or not. What should you do?
How to get the answer: To locate the answer, go to http://medlineplus.gov. Next, from the Health Topics page, click on Medical Encyclopedia. Under the Poison section, choose Window Cleaner.
Answer: Should you make him throw up (vomit)?

Problem: You look in the medicine cabinet and notice a bottle of pills marked acetaminophen. You now wonder what is the common or brand name for these pills and will they get rid of your fever.

How to get the answer: To locate the answer, go to http://medlineplus.gov. Next, from the Drug Information page, click on A-Am, then choose the word Acetaminophen. List one brand or common name used for acetaminophen.
Answer: Should taking acetaminophen get rid of your fever?

Problem: You want to use a search engine to find general health information on teens and alcohol.
How to get the answer: To locate the information, go to http://www.google.com. Type in the information you want to find, and click on Google Search.
Answer: What did you type in the Google Search box? List one of the addresses on the page that you looked at? Did you find the information you were looking for on the topic of teens and alcohol?

APPENDIX B

Western Pennsylvania School for the Deaf: pre-class survey and results

Twenty-two respondents participated in the pre-class survey.

1. Google (http://www.google.com) and Go (http://www.go.com) are called search engines. Have you ever used them to find information on the Internet?

Yes:	14	No:	4
Don't know:	4	No answer:	0

If you said yes, go to question number 2.
If you said no or don't know, go to question number 3.

2. If you said yes to question 1, did you find the information you were looking for?

Yes:	14	No:	2
Don't know:	4	No answer:	0

3. Do you ever check or evaluate the Websites you find to make sure the information is good?

Yes:	16	No:	4
Don't know:	2	No answer:	0

4. Do you ever use the Internet to find health information?

Yes:	19	No:	2
Don't know:	1	No answer:	0

If you said yes, go to question number 5.
If you said no or don't know, go to question number 6.

5. If you said yes to question 4, did you find the health information you were looking for?

Yes:	18	No:	1
Don't know:	2	No answer:	1

6. Have you ever looked at the Website http://medlineplus.gov to find health information?

Yes:	6	No:	13
Don't know:	1	No answer:	2

If you said yes, go to question number 7.
If you said no or don't know, go to question number 8.

7. If you said yes to question 6, did you find the health information you were looking for?

Yes:	9	No:	3
Don't know:	3	No answer:	7

8. When you find information on the Internet, do you think it is easy to understand?

Yes:	13	No:	3
Don't know:	4	No answer:	2

Appendix C

Western Pennsylvania School for the Deaf: post-class survey and results

Ten respondents participated in the post-class survey.

1. Google (http://www.google.com) and Go (http://www.go.com) are called search engines. Have you ever used them to find information on the Internet?

Yes:	8	No:	2
Don't know:	0	No answer:	0

If you said yes, go to question number 2.
If you said no or don't know, go to question number 3.

2. If you said yes to question 1, did you find the information you were looking for?

Yes:	8	No:	0
Don't know:	0	No answer:	2

3. Do you ever check or evaluate the Websites you find to make sure the information is good?

Yes:	8	No:	2
Don't know:	0	No answer:	0

4. Do you ever use the Internet to find health information?

Yes:	8	No:	2
Don't know:	0	No answer:	0

If you said yes, go to question number 5.
If you said no or don't know, go to question number 6.

5. If you said yes to question 4, did you find the health information you were looking for?

Yes:	8	No:	0
Don't know:	0	No answer:	2

6. Have you ever looked at the Website http://medlineplus.gov to find health information?

Yes:	8	No:	1
Don't know:	1	No answer:	0

If you said yes, go to question number 7.
If you said no or don't know, go to question number 8.

7. If you said yes to question 6, did you find the health information you were looking for?

Yes:	7	No:	2
Don't know:	0	No answer:	1

8. When you find information on the Internet, do you think it is easy to understand?

Yes:	9	No:	1
Don't know:	0	No answer:	0